

# OSRAM KW CSLPM2.PC

## Datasheet

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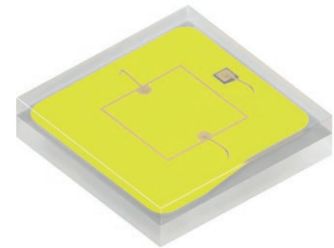
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## OSLON® Square Flat

# KW CSLPM2.PC

The most compact 3 x 3 mm high power LED with an electrical-ly isolated thermal pad allows for superior heat dissipation de-signs. The flat package shape enhances color homogeneity due to reduced color over angle variation. Extremely low thermal resistance helps to maintain the efficiency remarkably high even when driven at higher currents.



## Applications

- Entertainment
- Transportation

## Features

- Package: Ceramic package
- Chip technology: UX:3
- Typ. Radiation: 120° (Lambertian emitter)
- Color:  $C_x = 0.32$ ,  $C_y = 0.33$  acc. to CIE 1931 (● white)
- Corrosion Robustness Class: 3B
- Color temperature: 5000K - 6500K
- CRI: 70 (typ.)
- ESD: 8 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)

## Ordering Information

Type	Color temperature	Luminous Flux <sup>1)</sup> $I_F = 700 \text{ mA}$ $\Phi_V$	Ordering Code
KW CSLPM2.PC-7M7N-4H8I	5000 K	224 ... 400 lm	Q65112A7975
KW CSLPM2.PC-7M7N-4F8G	5700 K	224 ... 400 lm	Q65112A2577
KW CSLPM2.PC-7M7N-4C8E	6500 K	224 ... 400 lm	Q65112A2444

## Maximum Ratings

Parameter	Symbol		Values
Operating Temperature	$T_{op}$	min.	-40 °C
		max.	125 °C
Storage Temperature	$T_{stg}$	min.	-40 °C
		max.	125 °C
Junction Temperature	$T_j$	max.	135 °C
Forward current $T_s = 25\text{ °C}$	$I_F$	min.	200 mA
		max.	1800 mA
ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 3B)	$V_{ESD}$		8 kV
Reverse current <sup>2)</sup>	$I_R$	max.	200 mA

## Characteristics

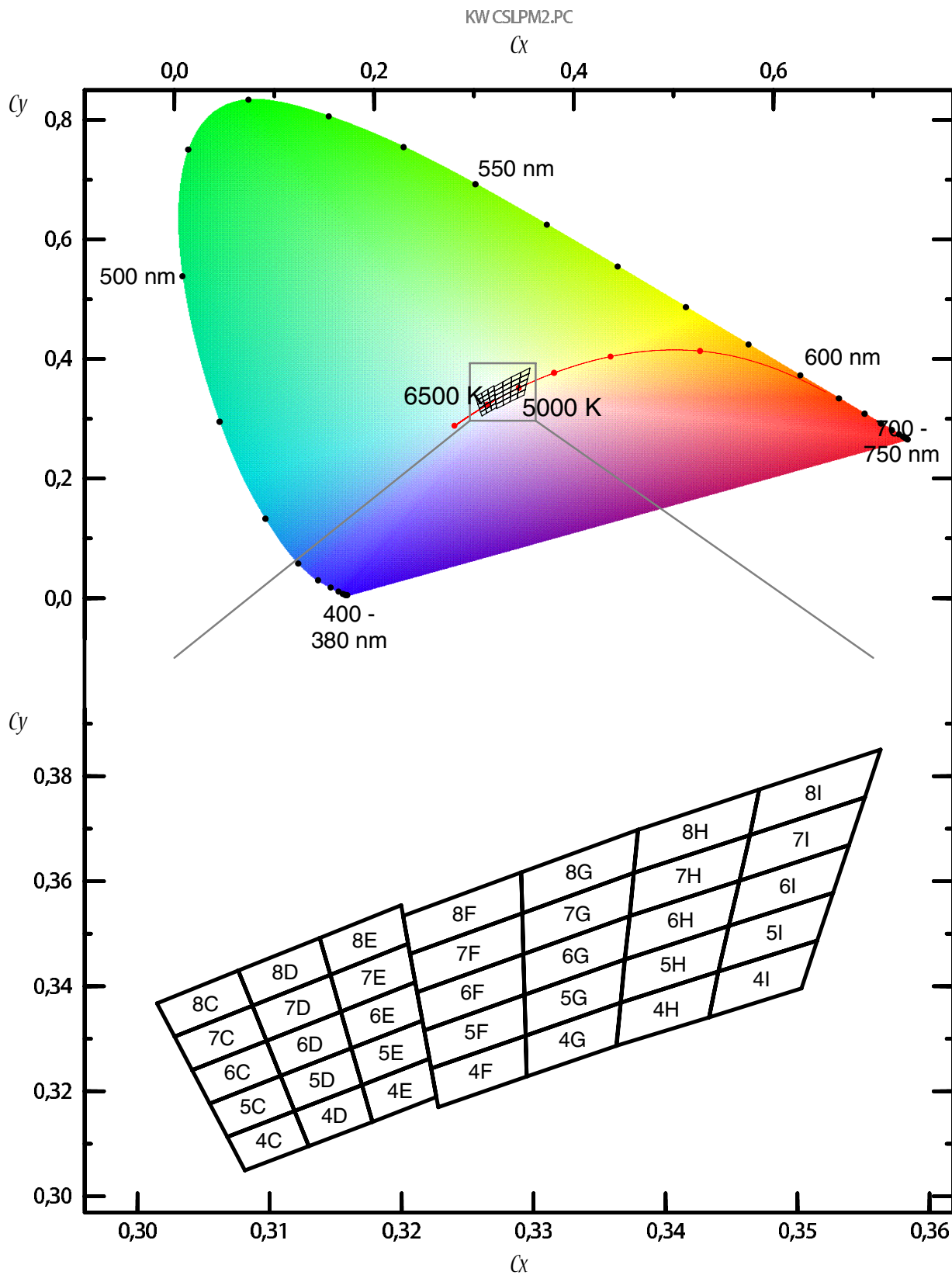
$I_F = 700 \text{ mA}$ ;  $T_s = 25 \text{ °C}$

Parameter	Symbol		Values
Chromaticity Coordinate <sup>3)</sup>	Cx	typ.	0.32
	Cy	typ.	0.33
Viewing angle at 50% $I_V$	$2\phi$	typ.	120 °
Forward Voltage <sup>4)</sup> $I_F = 700 \text{ mA}$	$V_F$	min.	2.70 V
		typ.	2.85 V
		max.	3.20 V
Reverse voltage (ESD device)	$V_{R\text{ESD}}$	min.	45 V
Reverse voltage <sup>2)</sup> $I_R = 20 \text{ mA}$	$V_R$	max.	1.2 V
Color Rendering Index	CRI	typ.	70
Real thermal resistance junction/solderpoint <sup>5)</sup>	$R_{\text{thJS real}}$	typ.	3.0 K / W
		max.	3.9 K / W
Electrical thermal resistance junction/solderpoint <sup>5)</sup> with efficiency $\eta_e = 42 \%$	$R_{\text{thJS elec.}}$	typ.	1.7 K / W
		max.	2.3 K / W

## Brightness Groups

Group	Luminous Flux <sup>1)</sup> $I_F = 700 \text{ mA}$ min. $\Phi_V$	Luminous Flux <sup>1)</sup> $I_F = 700 \text{ mA}$ max. $\Phi_V$	Luminous Intensity <sup>6)</sup> $I_F = 700 \text{ mA}$ typ. $I_v$
7M	224 lm	250 lm	78 cd
8M	250 lm	280 lm	88 cd
5N	280 lm	315 lm	98 cd
6N	315 lm	355 lm	111 cd
7N	355 lm	400 lm	125 cd

### Chromaticity Coordinate Groups



### Chromaticity Coordinate Groups <sup>3)</sup>

Group	Cx	Cy	CCT	Group	Cx	Cy	CCT	Group	Cx	Cy	CCT
4H	0.3363	0.3287	5000	8H	0.3376	0.3616	5000	7F	0.3212	0.3389	5700
	0.3366	0.3369	5000		0.3379	0.3698	5000		0.3206	0.3462	5700
	0.3441	0.3428	5000		0.3471	0.3775	5000		0.3292	0.3539	5700
	0.3433	0.3341	5000		0.3464	0.3688	5000		0.3292	0.3461	5700
4I	0.3433	0.3341	5000	8I	0.3464	0.3688	5000	7G	0.3292	0.3461	5700
	0.3441	0.3428	5000		0.3471	0.3775	5000		0.3292	0.3539	5700
	0.3515	0.3487	5000		0.3563	0.3851	5000		0.3376	0.3616	5700
	0.3503	0.3396	5000		0.3551	0.3760	5000		0.3373	0.3534	5700
5H	0.3366	0.3369	5000	4F	0.3228	0.3170	5700	8F	0.3206	0.3462	5700
	0.3369	0.3451	5000		0.3222	0.3243	5700		0.3201	0.3534	5700
	0.3448	0.3515	5000		0.3294	0.3306	5700		0.3291	0.3617	5700
	0.3441	0.3428	5000		0.3295	0.3228	5700		0.3292	0.3539	5700
5I	0.3441	0.3428	5000	4G	0.3295	0.3228	5700	8G	0.3292	0.3539	5700
	0.3448	0.3515	5000		0.3294	0.3306	5700		0.3291	0.3617	5700
	0.3527	0.3578	5000		0.3366	0.3369	5700		0.3379	0.3698	5700
	0.3515	0.3487	5000		0.3363	0.3287	5700		0.3376	0.3616	5700
6H	0.3369	0.3451	5000	5F	0.3222	0.3243	5700	4C	0.3081	0.3049	6500
	0.3373	0.3534	5000		0.3217	0.3316	5700		0.3068	0.3113	6500
	0.3456	0.3601	5000		0.3293	0.3384	5700		0.3119	0.3162	6500
	0.3448	0.3515	5000		0.3294	0.3306	5700		0.3130	0.3095	6500
6I	0.3448	0.3515	5000	5G	0.3294	0.3306	5700	4D	0.3130	0.3095	6500
	0.3456	0.3601	5000		0.3293	0.3384	5700		0.3119	0.3162	6500
	0.3539	0.3669	5000		0.3369	0.3451	5700		0.3170	0.3212	6500
	0.3527	0.3578	5000		0.3366	0.3369	5700		0.3178	0.3142	6500
7H	0.3373	0.3534	5000	6F	0.3217	0.3316	5700	4E	0.3178	0.3142	6500
	0.3376	0.3616	5000		0.3212	0.3389	5700		0.3170	0.3212	6500
	0.3464	0.3688	5000		0.3292	0.3461	5700		0.3221	0.3262	6500
	0.3456	0.3601	5000		0.3293	0.3384	5700		0.3226	0.3189	6500
7I	0.3456	0.3601	5000	6G	0.3293	0.3384	5700	5C	0.3068	0.3113	6500
	0.3464	0.3688	5000		0.3292	0.3461	5700		0.3055	0.3177	6500
	0.3551	0.3760	5000		0.3373	0.3534	5700		0.3108	0.3229	6500
	0.3539	0.3669	5000		0.3369	0.3451	5700		0.3119	0.3162	6500



Group	Cx	Cy	CCT	Group	Cx	Cy	CCT	Group	Cx	Cy	CCT
5D	0.3119	0.3162	6500	6E	0.3162	0.3282	6500	8C	0.3028	0.3304	6500
	0.3108	0.3229	6500		0.3154	0.3352	6500		0.3015	0.3368	6500
	0.3162	0.3282	6500		0.3210	0.3408	6500		0.3076	0.3430	6500
	0.3170	0.3212	6500		0.3216	0.3334	6500		0.3087	0.3363	6500
5E	0.3170	0.3212	6500	7C	0.3041	0.3240	6500	8D	0.3087	0.3363	6500
	0.3162	0.3282	6500		0.3028	0.3304	6500		0.3076	0.3430	6500
	0.3216	0.3334	6500		0.3087	0.3363	6500		0.3138	0.3492	6500
	0.3221	0.3262	6500		0.3098	0.3296	6500		0.3146	0.3422	6500
6C	0.3055	0.3177	6500	7D	0.3098	0.3296	6500	8E	0.3146	0.3422	6500
	0.3041	0.3240	6500		0.3087	0.3363	6500		0.3138	0.3492	6500
	0.3098	0.3296	6500		0.3146	0.3422	6500		0.3200	0.3554	6500
	0.3108	0.3229	6500		0.3154	0.3352	6500		0.3205	0.3481	6500
6D	0.3108	0.3229	6500	7E	0.3154	0.3352	6500				
	0.3098	0.3296	6500		0.3146	0.3422	6500				
	0.3154	0.3352	6500		0.3205	0.3481	6500				
	0.3162	0.3282	6500		0.3210	0.3408	6500				

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## Group Name on Label

**Example: 5N-4C**

Brightness

Color Chromaticity

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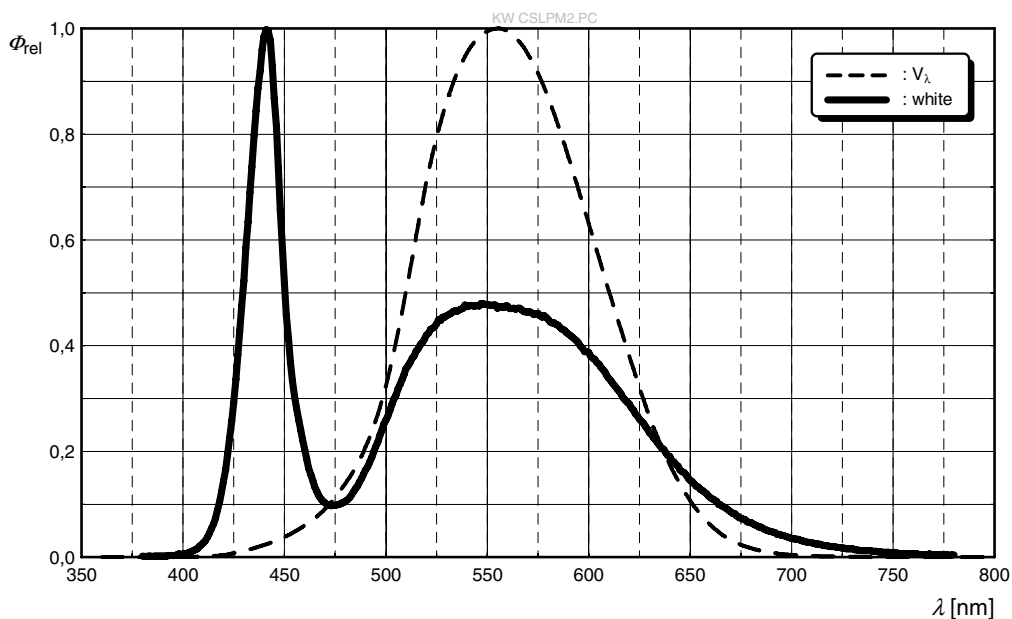
5N

4C

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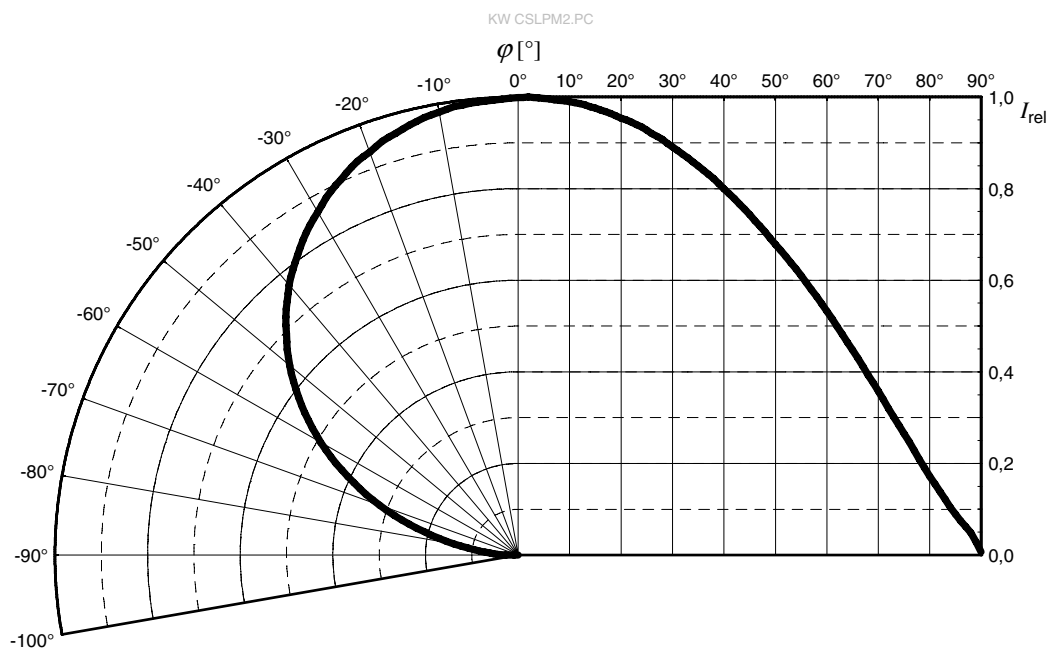
### Relative Spectral Emission <sup>6)</sup>

$\Phi_{rel} = f(\lambda); I_F = 700 \text{ mA}; T_S = 25 \text{ }^\circ\text{C}$



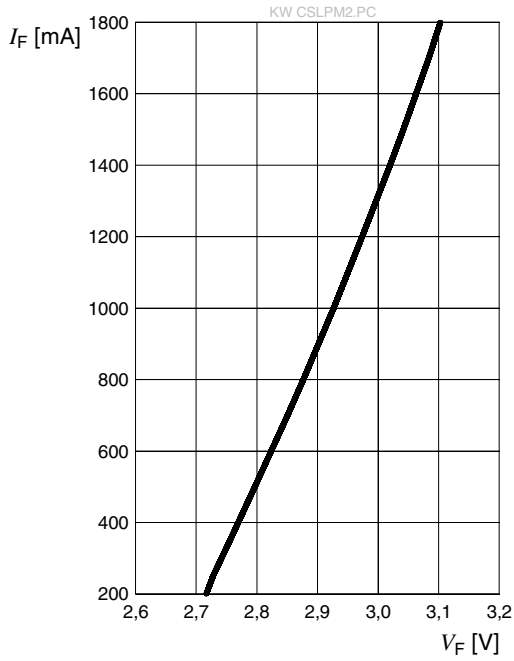
### Radiation Characteristics <sup>6)</sup>

$I_{rel} = f(\phi); T_S = 25 \text{ }^\circ\text{C}$



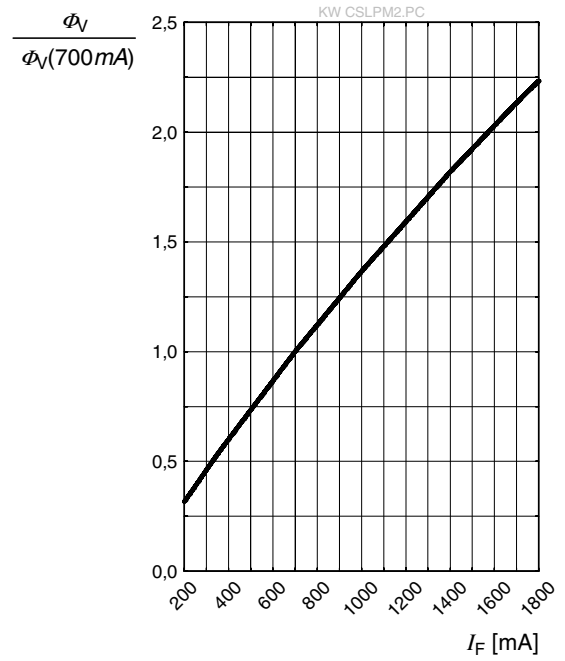
**Forward current** 6), 7)

$I_F = f(V_F); T_S = 25\text{ °C}$



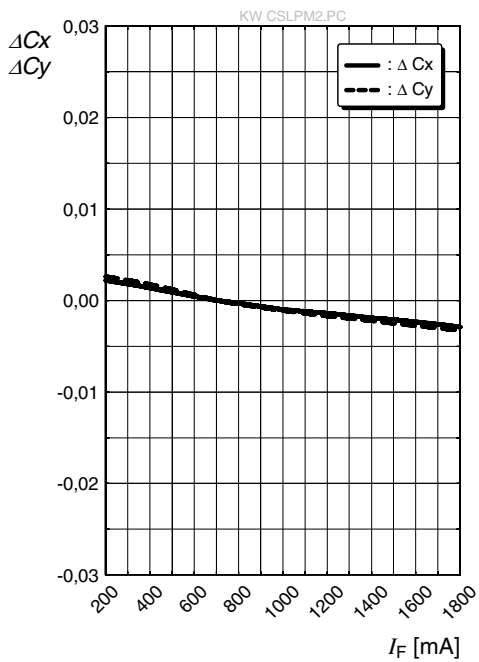
**Relative Luminous Flux** 6), 7)

$\Phi_V / \Phi_V(700\text{ mA}) = f(I_F); T_S = 25\text{ °C}$



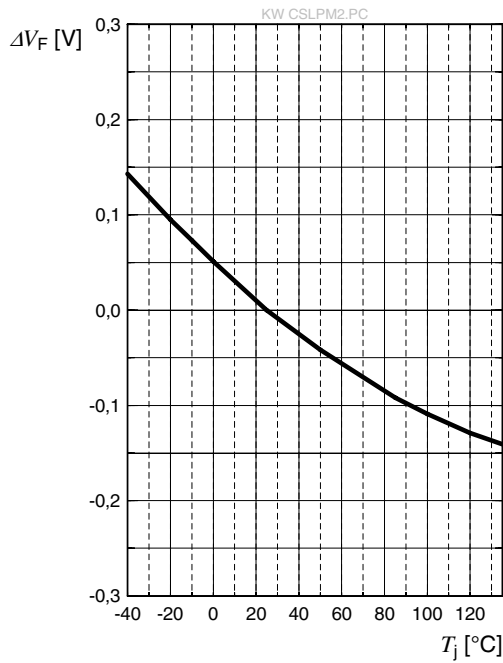
**Chromaticity Coordinate Shift** 6)

$\Delta Cx, \Delta Cy = f(I_F); T_S = 25\text{ °C}$



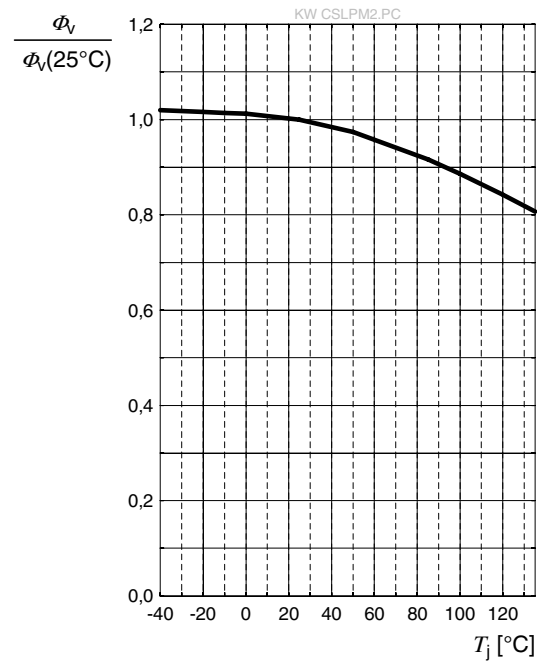
### Forward Voltage <sup>6)</sup>

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 700\text{ mA}$$



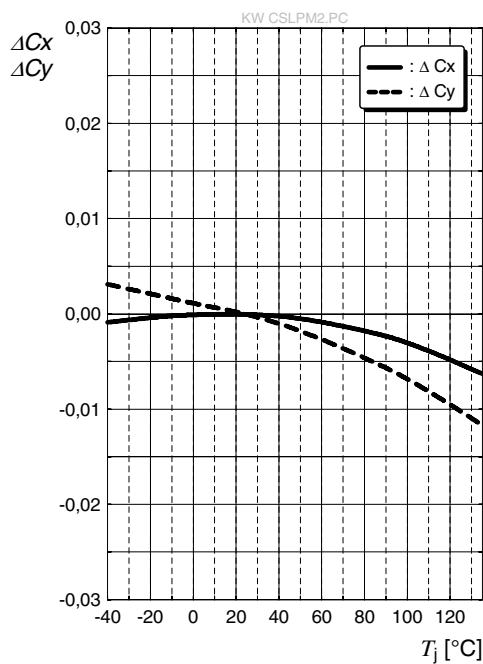
### Relative Luminous Flux <sup>6)</sup>

$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j); I_F = 700\text{ mA}$$



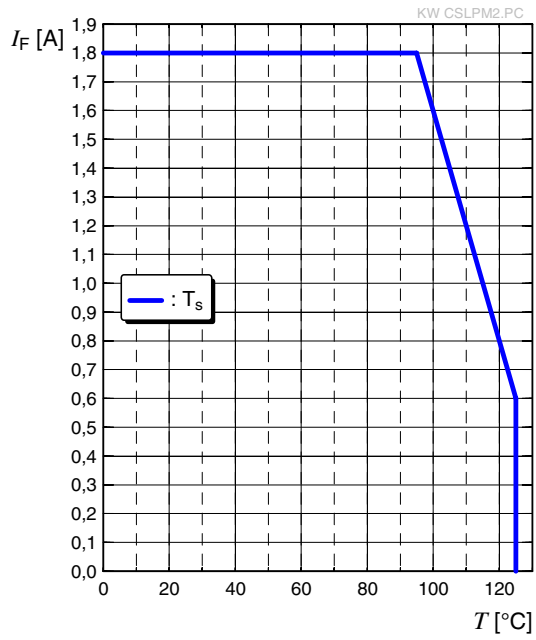
### Chromaticity Coordinate Shift <sup>6)</sup>

$$\Delta C_x, \Delta C_y = f(T_j); I_F = 700\text{ mA}$$

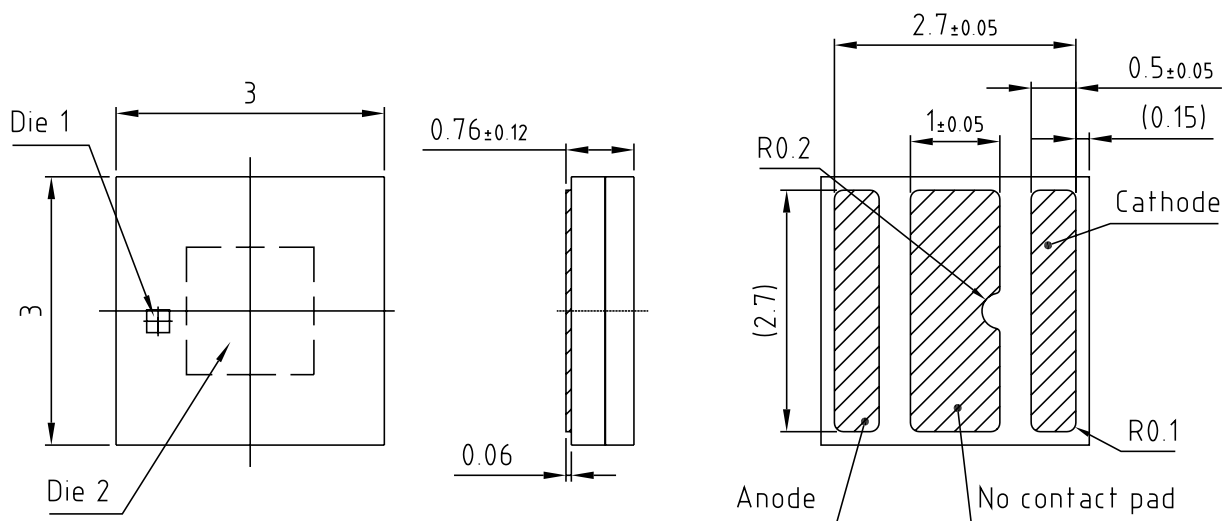


## Max. Permissible Forward Current

$$I_F = f(T)$$



## Dimensional Drawing <sup>8)</sup>



C67062-A0200-A1-02

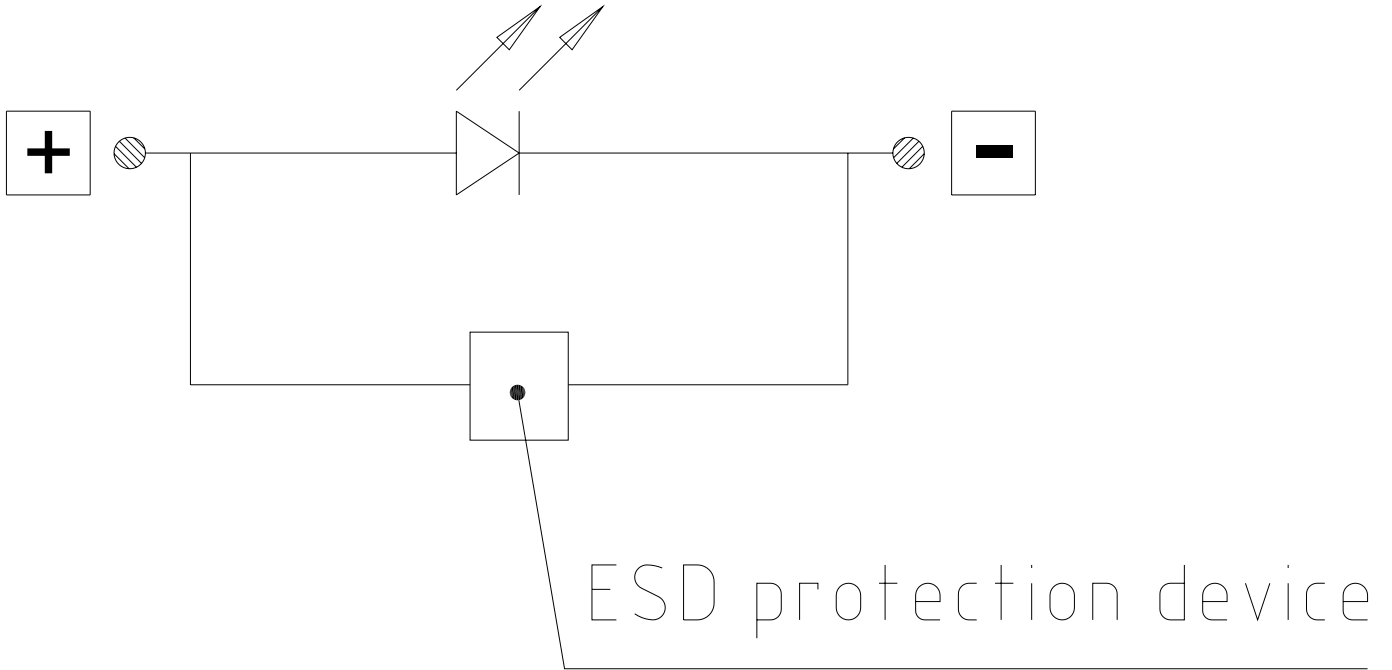
## Further Information:

**Approximate Weight:** 21.2 mg

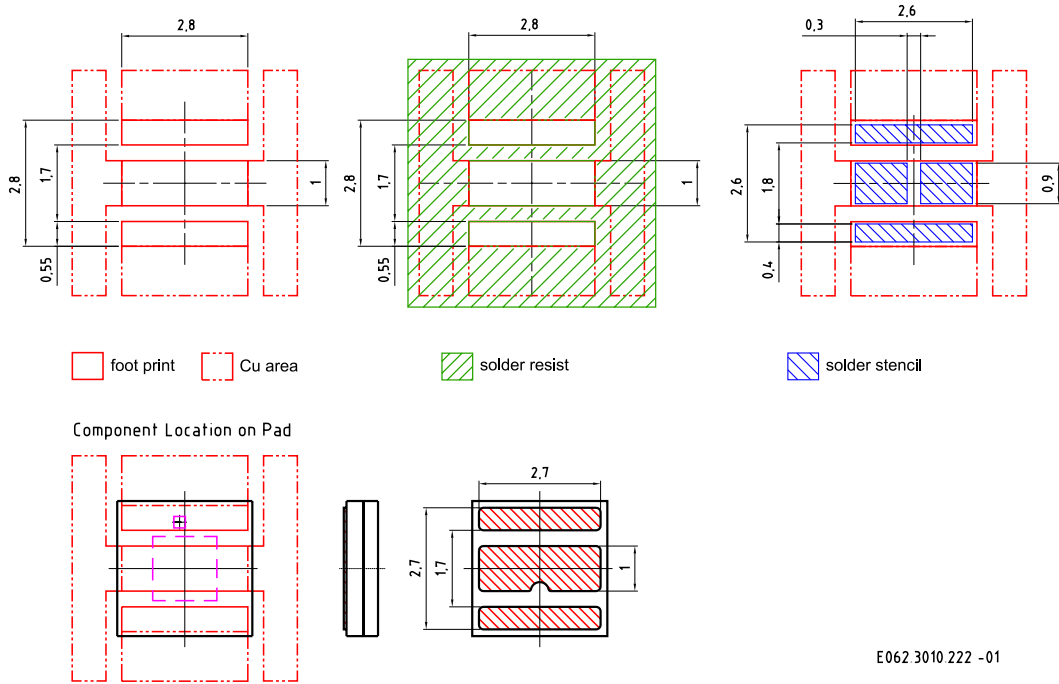
**Corrosion test:** Class: 3B  
Test condition: 40°C / 90 % RH / 15 ppm H<sub>2</sub>S / 14 days (stricter than IEC 60068-2-43)

**ESD advice:** The device is protected by ESD device which is connected in parallel to the Chip.

Electrical Internal Circuit



Recommended Solder Pad <sup>8)</sup>



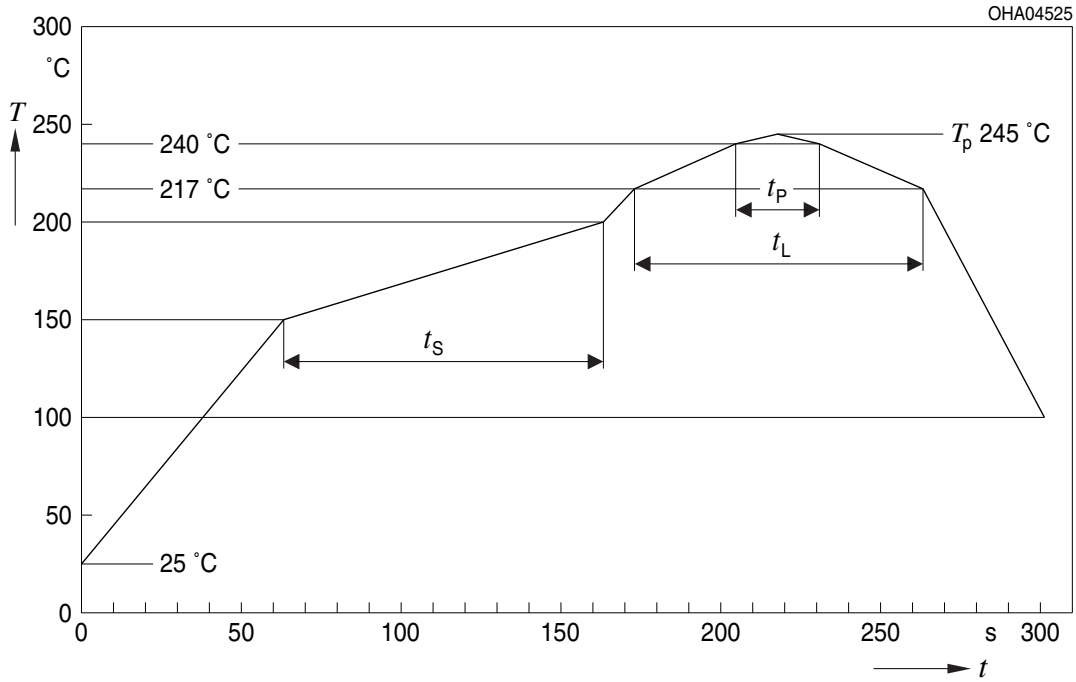
E062.3010.222 -01

For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere. Package not suitable for ultra sonic cleaning. To ensure a high solder joint reliability and to minimize the risk of solder joint cracks, the customer is responsible to evaluate the combination of PCB board and solder paste material for his application.



### Reflow Soldering Profile

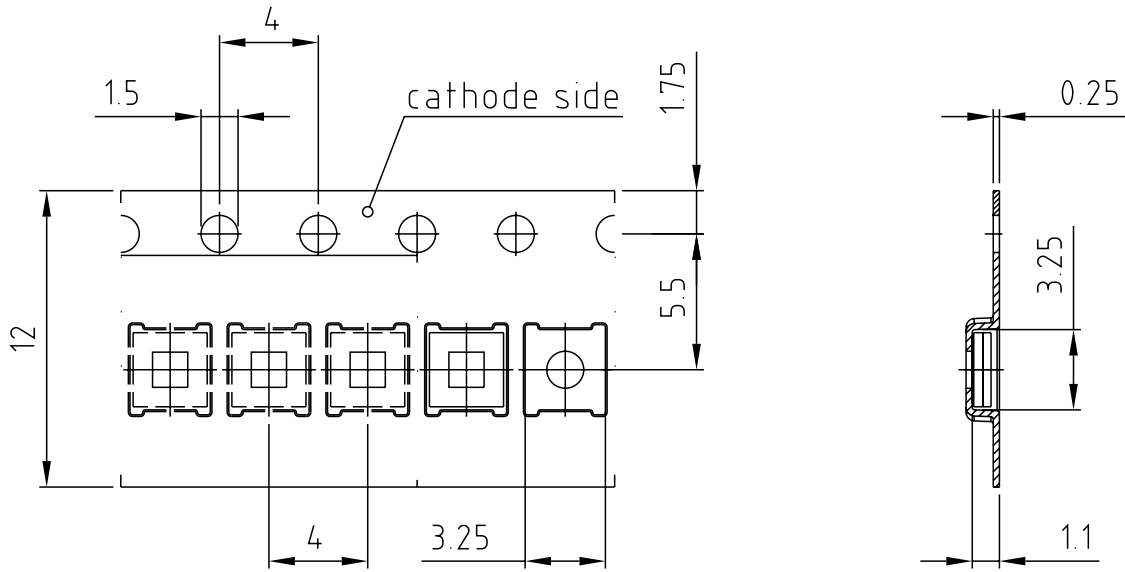
Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



Profile Feature	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat <sup>*)</sup> 25 °C to 150 °C			2	3	K/s
Time $t_s$ $T_{Smin}$ to $T_{Smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak <sup>*)</sup> $T_{Smax}$ to $T_p$			2	3	K/s
Liquidus temperature	$T_L$		217		°C
Time above liquidus temperature	$t_L$		80	100	s
Peak temperature	$T_p$		245	260	°C
Time within 5 °C of the specified peak temperature $T_p - 5$ K	$t_p$	10	20	30	s
Ramp-down rate* $T_p$ to 100 °C			3	6	K/s
Time 25 °C to $T_p$				480	s

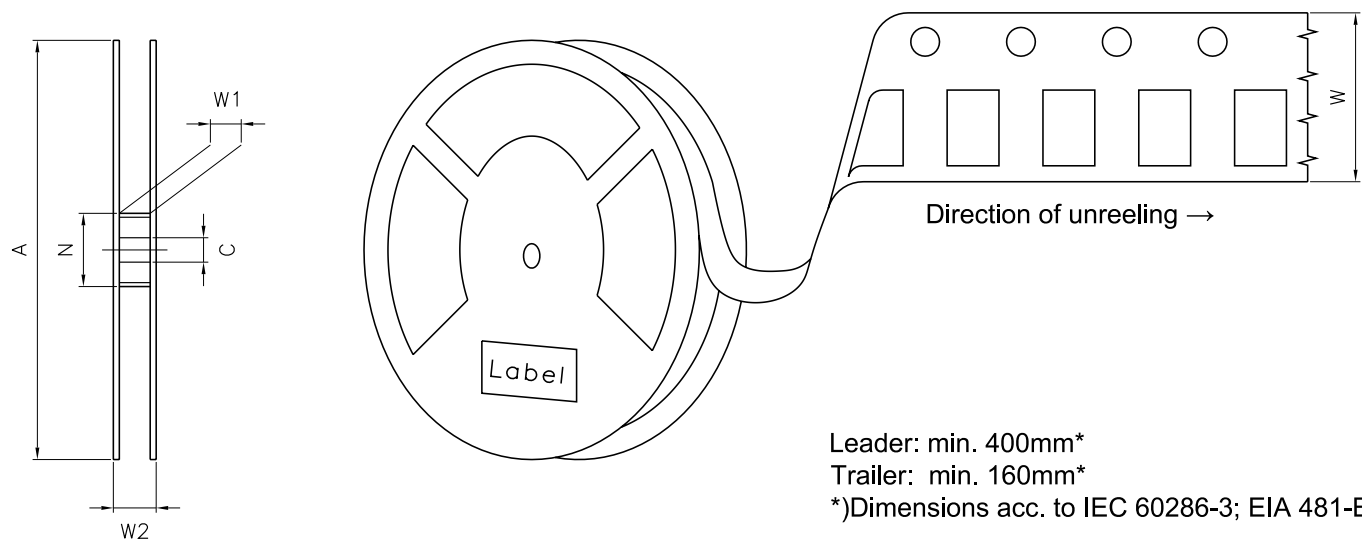
All temperatures refer to the center of the package, measured on the top of the component  
 \*) slope calculation  $DT/Dt$ :  $Dt$  max. 5 s; fulfillment for the whole T-range

Taping <sup>8)</sup>



C67062-A0200-B8-02

**Tape and Reel** <sup>9)</sup>



**Reel Dimensions**

A	W	N <sub>min</sub>	W <sub>1</sub>	W <sub>2max</sub>	Pieces per PU
180 mm	12 + 0.3 / - 0.1 mm	60 mm	12.4 + 2 mm	18.4 mm	600

**Barcode-Product-Label (BPL)**

**OSRAM Opto Semiconductors** LX XXXX    BIN1: XX-XX-X-XXX-X

RoHS Compliant

(6P) BATCH NO: 1234567890 ML Temp    ST  
X    XXX °C X

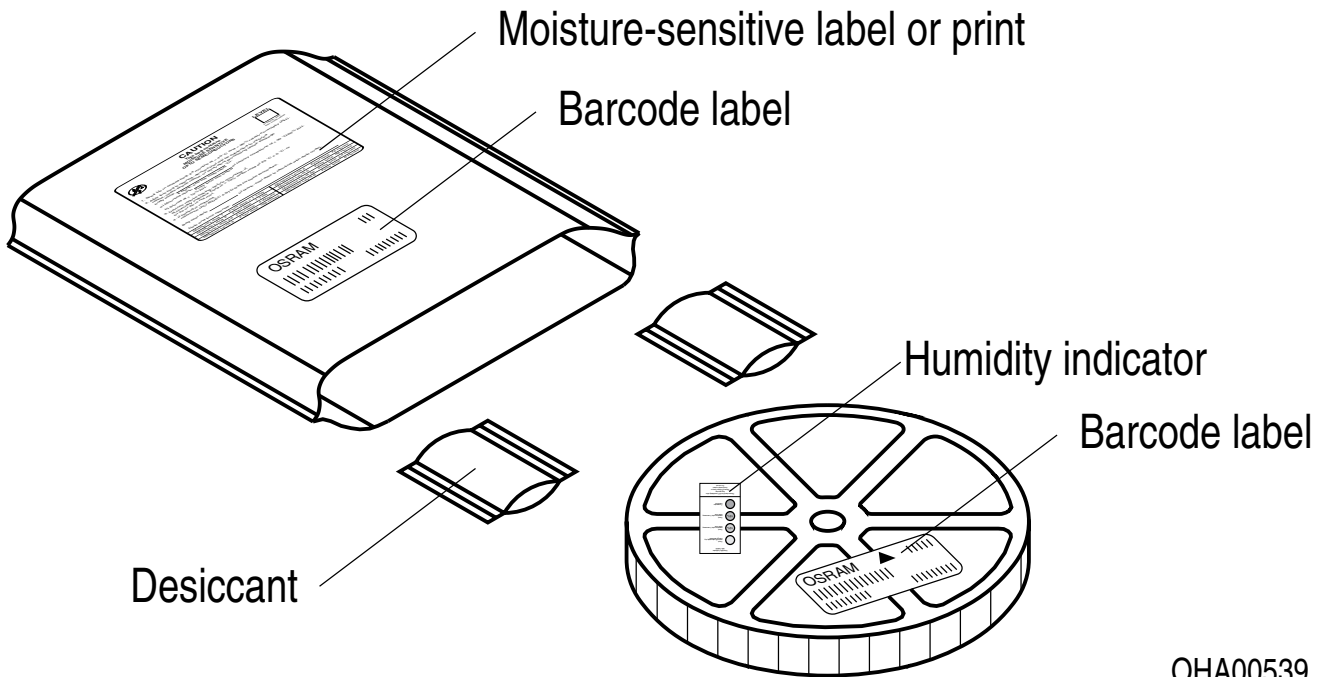
(1T) LOT NO: 1234567890 (9D) D/C: 1234

Pack: RXX  
DEMY    XXX  
X\_X123\_1234.1234 X

(X) PROD NO: 123456789(Q)QTY: 9999 (G) GROUP: XX-XX-X-X

OHA04563

**Dry Packing Process and Materials** <sup>8)</sup>



OHA00539

Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card according JEDEC-STD-033.

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## Notes

The evaluation of eye safety occurs according to the standard IEC 62471:2006 (photo biological safety of lamps and lamp systems). Within the risk grouping system of this IEC standard, the device specified in this data sheet fall into the class **moderate risk (exposure time 0.25 s)**. Under real circumstances (for exposure time, conditions of the eye pupils, observation distance), it is assumed that no endangerment to the eye exists from these devices. As a matter of principle, however, it should be mentioned that intense light sources have a high secondary exposure potential due to their blinding effect. When looking at bright light sources (e.g. headlights), temporary reduction in visual acuity and afterimages can occur, leading to irritation, annoyance, visual impairment, and even accidents, depending on the situation.

Subcomponents of this device contain, in addition to other substances, metal filled materials including silver. Metal filled materials can be affected by environments that contain traces of aggressive substances. Therefore, we recommend that customers minimize device exposure to aggressive substances during storage, production, and use. Devices that showed visible discoloration when tested using the described tests above did show no performance deviations within failure limits during the stated test duration. Respective failure limits are described in the IEC60810.

For further application related information please visit [www.osram-os.com/appnotes](http://www.osram-os.com/appnotes)

## Disclaimer

### Attention please!

The information describes the type of component and shall not be considered as assured characteristics. Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances.

For information on the types in question please contact our Sales Organization.

If printed or downloaded, please find the latest version on our website.

### Packing

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

### Product and functional safety devices/applications or medical devices/applications

Our components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.

Our products are not qualified at module and system level for such application.

In case buyer – or customer supplied by buyer – considers using our components in product safety devices/ applications or medical devices/applications, buyer and/or customer has to inform our local sales partner immediately and we and buyer and /or customer will analyze and coordinate the customer-specific request between us and buyer and/or customer.

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## Glossary

- 1) **Brightness:** Brightness values are measured during a current pulse of typically 25 ms, with an internal reproducibility of  $\pm 8\%$  and an expanded uncertainty of  $\pm 11\%$  (acc. to GUM with a coverage factor of  $k = 3$ ).
- 2) **Reverse Operation:** This product is intended to be operated applying a forward current within the specified range. Applying any continuous reverse bias or forward bias below the voltage range of light emission shall be avoided because it may cause migration which can change the electro-optical characteristics or damage the LED.
- 3) **Chromaticity coordinate groups:** Chromaticity coordinates are measured during a current pulse of typically 25 ms, with an internal reproducibility of  $\pm 0.005$  and an expanded uncertainty of  $\pm 0.01$  (acc. to GUM with a coverage factor of  $k = 3$ ).
- 4) **Forward Voltage:** The forward voltage is measured during a current pulse of typically 8 ms, with an internal reproducibility of  $\pm 0.05$  V and an expanded uncertainty of  $\pm 0.1$  V (acc. to GUM with a coverage factor of  $k = 3$ ).
- 5) **Thermal Resistance:**  $R_{th\ max}$  is based on statistic values ( $6\sigma$ ).
- 6) **Typical Values:** Due to the special conditions of the manufacturing processes of semiconductor devices, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.
- 7) **Characteristic curve:** In the range where the line of the graph is broken, you must expect higher differences between single devices within one packing unit.
- 8) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with  $\pm 0.1$  and dimensions are specified in mm.
- 9) **Tape and Reel:** All dimensions and tolerances are specified acc. IEC 60286-3 and specified in mm.

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## Revision History

Version	Date	Change
1.3	2019-02-07	Ordering Information Chromaticity Coordinate Groups
1.4	2020-03-23	Schematic Transportation Box Dimensions of Transportation Box
1.5	2021-12-10	Features Characteristics
1.6	2022-11-09	New Layout Applications

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EU RoHS and China RoHS compliant product

此产品符合欧盟 RoHS 指令的要求；  
按照中国的相关法规和标准，  
不含有毒有害物质或元素。

**Published by ams-OSRAM AG**

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